

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Hibiscus dasycalyx*

COMMON NAME: Neches River rose-mallow

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: 11 May 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☐ Listing priority change

Former LP: ☐

New LP: ____

Date when the species first became a Candidate (as currently defined): March 24, 1997

____ Candidate removal: Former LP:

____ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

____ F – Range is no longer a U.S. territory.

____ I – Insufficient information exists on biological vulnerability and threats to support listing.

____ M – Taxon mistakenly included in past notice of review.

____ N – Taxon does not meet the Act's definition of "species."

____ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering Plant, Malvaceae (Mallow family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Cherokee, Houston, and Trinity Counties, Texas

LAND OWNERSHIP: A total of 10 sites with current or historic *Hibiscus dasycalyx* populations are known. Three of these sites lie within Texas Department of Transportation rights-of-way and collectively sustain perhaps 10% of the total population of Neches River rose-mallow. Four sites occur on National Forest land and support about 30% of known individuals. Three sites are on private land and support 60% of all known rose-mallows. One of these is owned by a conservation land trust and protects about 20% of known rose-mallows. Another 20% is protected with a Candidate Conservation Agreement. The status of the third site, which supported another 20% of rose-mallows, is currently unknown but will be determined.

LEAD REGION CONTACT: Susan Jacobsen, 505-248-6641

LEAD FIELD OFFICE CONTACT: Clear Lake Ecological Services Field Office, Carlos Mendoza, 281-286-8282

BIOLOGICAL INFORMATION

Species Description: The Neches River rose-mallow is a shrubby perennial plant which grows 3-7 feet tall with one or more (often many) woody stems per clump. It bears large and showy flowers about 3-6 inches wide, each with five 2-4 inch-long petals. The flowers are usually creamy-white with a deep-red or purple center at the base. The five sepals and 12 bracteoles of

the calyx are densely covered with long hairs, distinguishing it from other rose-mallow species. The 2-4 inch long leaves are deeply 3-lobed and arrowhead-shaped, with each lobe linear and slenderly tapering from 1-4 inches at the base to less than 0.2 inches wide at the tip. Leaf margins are irregular or saw-toothed. It blooms in the summer, generally June to September. The fruit is a rounded capsule generally present July to November. Mature seeds are densely pubescent (hairy) and buoyant in water for several hours.

Taxonomy: The Neches River rose-mallow was first collected by Ivan Shiller in 1955 near Apple Springs in Trinity County (Klips 1995). S. Blake (1958) described the specimen as a new and very distinct species that appeared to be allied with *Hibiscus coccineus* and *H. laevis*. He noted that it had leaves “much like those of the former species and corolla more than like that of the latter, but at once distinguished from both of them and from all other United States species by its densely spreading-hirsute calyx.” Orland Blanchard (1976) visited the type location in 1968 and noted that *H. dasycalyx* showed strong affinity with the wide-spread *H. laevis*, but differed from it by having more narrowly lobed leaves and prominently pubescent calyx and fruit. He noted that all 100 plants present at the type location resembled the type specimen (Blanchard 1976). Plants grown from wild-collected seed also remained consistent, and produced viable seed (Blanchard 1976). After his observation of rose-mallows at three sites, Warnock (1995) also concluded that the *H. dasycalyx* was a valid species.

Klips (1995) used enzyme electrophoresis to examine protein polymorphism in allozymes of *H. dasycalyx*, *H. laevis*, and *H. moscheutos*. He found that all three taxa were diploid and shared predominant alleles for all enzyme systems except three, which were absent in *H. moscheutos*, but displayed generally identical banding patterns for *H. dasycalyx* and *H. laevis*. He also found variation in leaf shape and calyx pubescence among populations of *H. laevis*, including forms intermediate between typical *H. laevis* and *H. dasycalyx*. Klips concluded that *H. dasycalyx* could be considered a subspecies or variety of *H. laevis*, but still a separate taxon. He noted the occurrence of morphologically intermediate characters in populations where the two species were sympatric.

Dr. Bea Clack at Stephen F. Austin State University (SFASU) has conducted further genetic testing of *H. dasycalyx*, *H. laevis*, and *H. moscheutos* by isolating their genomic DNA for comparisons (Clack 2003). Comparisons were made using five different Random Amplified Polymorphic DNA (RAPD) primers, 10 base-pair long oligonucleotides. Normally, each RAPD primer amplifies different genomic loci, and a single set of primers can be used for any genome. However, RAPD was not able to reproducibly generate a fingerprint for all three species Clack (2003). The use of ISSR primers (inter-simple sequence repeat), however, were able to generate 79 polymorphic loci and unique banding patterns for each species (Mendoza 2004). *H. dasycalyx* produced four prominent markers at 380, 510, 850, and 900 base-pairs in length, and a variable band at 1490 (Mendoza 2004). *H. moscheutos* also demonstrated bands at 380 and 510, but the remaining bands were unique. *H. laevis* generated only one single band at the 510 base-pair size. Data regarding genetic diversity was significantly different for each species. These results indicate that *H. dasycalyx* is unique in comparison with *H. laevis* and *H. moscheutos* (Mendoza 2004).

We have carefully reviewed the above information and have confirmed our conclusion that *H. dasycalyx* is a valid taxon, distinct from other sympatric *Hibiscus* species. Additional sequences will be tested to further demonstrate similarities or differences between the three species. Knowing the extent of genetic diversity for each *Hibiscus* species is necessary information for the future, since hybridization of certain populations may prove to be an increasing problem.

Habitat/Life History: The Neches River rose-mallow appears to be restricted to wetland areas that are exposed to open sun (Kennedy et al. 1990, Scott 1997). It is generally found growing in open, marshy areas (ponds, sloughs, oxbows) within the immediate floodplain of a permanent stream or river (Blanchard 1976, Warnock 1995). Areas supporting the plant normally hold standing water early in the growing season, with water levels dropping, but never drying completely until very late in the growing season. This species appears to have community dominance within the narrow band between high and low water levels in wetlands exposed to the open sun (Scott 1997, Scott and Creech 1997). The species is a perennial with some-to-many woody stems. However, the upper parts of the plant die back each year after blooming, and new growth is produced in the spring. Blooming occurs generally June to September. Fruit is generally present July to November (Scott 1997). The species is apparently self-fertilizing (Blanchard 1976).

Historical Range/Distribution: The Neches River rose-mallow was first collected in 1955 by Ivan Shiller on a shrubby marshland west of the Neches River near Apple Springs in Trinity County (Klips 1995). Local botanists continued to monitor the type location, and conducted an extensive search for additional populations through 12 counties (Kennedy et al. 1990, Warnock 1995). In 1991, a second population was found near Lovelady in Houston County (32 miles southwest of the type location) where about 50 plants were situated along the margin of a small stock pond (Warnock 1995). Herbicide use and compaction by cattle eventually caused the loss of this population. Specimens seen in the herbaria of Sam Houston State University and Stephen F. Austin State University suggested the existence of two other populations, but these were never relocated (Klips 1995). A status survey by Warnock (1995) covered 10 counties and resulted in the discovery of a third site, in Cherokee County. These three locations represented three separate counties (Cherokee, Houston, Trinity) and three different watersheds (Angelina, Neches, Trinity Rivers), suggesting a relatively wide historical range (Warnock 1995).

Current Range/Distribution and Population Estimates/Status:

In recent years, Neches River rose-mallow has been documented at 10 sites, but may now be extinct at 1 of these sites and has not been found recently at 2 others. The combined total number of individuals is estimated currently estimated to be 1410 at 7 sites, as summarized in Table 1. Additional Information regarding the current known distribution of this taxon and population estimates for the 10 sites are summarized below.

Table 1. Summary of current population estimates for Neches River rose-mallow (see text for details and citations).

<u>County/Site</u>	<u>Most Recent Population Estimate</u>	<u>Year of Estimate</u>
<u>Cherokee County</u> – ▪ Ponta Highway 204 ROW site on Mud Creek	<u>0</u>	<u>2005</u>
<u>Houston County</u> – ▪ Lovelady Highway 230 ROW	<u>0</u>	<u>2005</u>
▪ Lovelady private land site (adjacent to Highway 230 ROW site)	<u>300</u>	<u>2005</u>
▪ Davy Crockett National Forest, Compartment 55	<u>400 +</u>	<u>2004</u>
▪ Davy Crockett National Forest, Compartment 16	<u>40</u>	<u>2004</u>
▪ Davy Crockett National Forest, Compartment 20	<u>150</u>	<u>2004</u>
▪ Davy Crockett National Forest, Compartment 11	<u>200</u>	<u>2004</u>
<u>Trinity County</u> – ▪ near White Rock Creek (west Trinity County)	<u>300</u>	<u>2001</u>
▪ Highway 94 ROW and roadside park site (near Neches River, east Trinity County)	<u>20</u>	<u>2005</u>
▪ Temple-Inland site (east Trinity County)	<u>0</u>	<u>2005</u>
<u>Total Estimated Number of Plants</u>	<u>1410</u>	

Cherokee County - Ponta Highway 204 ROW site on Mud Creek: Because of a management agreement with the Texas Department of Transportation, ROW sites that support the rose-mallow are censused on an annual basis by Jackie Poole, botanist with the Texas Parks and Wildlife Department. Only one *H. dasycalyx* was seen regularly during years 1993-2000 (Poole 2001). The number of stems averaged 6 and the number of flowers/fruits averaged 100 for 1993-1998. Five plants were seen in 2001, one in 2002 and 2003, but none in 2004 and 2005. About 75-100 plants lying beneath the Mud Creek bridge were found in 2003, but these were found to represent a hybrid swarm with wide variation in morphology (Poole and Singhurst 2003), some resembling *H. laevis* and some *H. dasycalyx*. In the past, the *dasycalyx* population along Mud Creek on the adjacent private land was probably extensive. However, only obvious hybrids occur here now. Non-hybrid *dasycalyx* is probably extinct at this site (FWS).

Houston County - Lovelady Highway 230 ROW site near Tantabogue Creek southwest of Lovelady in Houston County): This site supported an average of 3 plants during years 1993-1997, 13 in 1998, 14 in 1999, 8 in 2000, and 4 in 2001. The number of stems ranged from 5 to

73, but averaged 33 for years 1993-1999. The number of fruits/flowers averaged 132 for years 1993-1999 (Poole 2001). No plants were seen in 2003–2005 (FWS). This site has been impacted by herbicides during the rose-mallow's growing and blooming season despite the existence of a management agreement.

Lovelady private land site (adjacent to Highway 230 ROW site). The area supports an average of 300 plants (years 2001-2005) along a wide drainage-way. This site was purchased by the Natural Area Preservation Association, a land trust organization, in 2004 for the purpose of protecting the rose-mallow population (FWS). This site is currently being impacted by cattle grazing (soil compaction and trampling of plants). Future management of the site may involve restricting the cattle to certain areas, or eliminating them altogether.

Davy Crockett National Forest, Compartment 55, at the southern end of Forest Road 503. This site was discovered in 2003. The population is large (at least 400 plants), but has not yet been fully tallied (FWS). .

Davy Crockett National Forest, Compartment 16. In year 2000, about 400 plants were placed into this site as part of a reintroduction effort. Unfortunately, the hydrology of the large wetland existing at this site was altered with the loss of a beaver dam and its re-establishment at a different location about 200 feet upstream and just upstream of the introduction area. This resulted in a reduced water level at the primary introduction site. In 2003, only 78 plants were seen, all of them clustered near the new beaver dam, where deeper water remained (Griffith 2003). Only about 40 plants were seen in 2004 (FWS). Periodic drought has reduced the number of rose-mallows that can survive these drier conditions caused by the dam's relocation. A permanent dam placed at the beaver dam's original location could return suitable conditions for the rose-mallow, as well as recover a larger wetland area (FWS).

Davy Crockett National Forest, Compartment 20. In year 2000, about 350 plants were placed into this area as part of a reintroduction effort. Since then, this area has sustained a population of about 150 through year 2004 (FWS).

Davy Crockett National Forest, Compartment 11. In September 2004, about 200 plants were placed along parts of a 10-acre wetland (FWS). Success of most of these is expected, since habitat conditions appear to be ideal. However, budget constraints prevented a 2005 census of the site by FWS.

Trinity County - Champion site (on private land owned previously by Champion International near White Rock Creek in west Trinity County). This area originally supported about 300 individuals as of year 2001 (FWS). However, ownership of this site has changed, and its current status is unknown. FWS has not yet learned the new landowner's identity.

Highway 94 ROW and roadside park site (near Neches River in east Trinity County: This site supported an average of 35 *dasycalyx* plants for years 1993-1995, 15 in 1996-1998, 49 - 1999, 17 - 2000, 15 – 2001 (Poole 2001). The number of stems ranged from 25 to 200, but averaged 103

for years 1993-1999. The number of flowers/fruits averaged 176 for years 1993-1999. In 2001, five hybrids, along with 10 *H. moscheutos* plants and four *H. laevis* plants, were observed in an area left un-mowed by maintenance personnel. By request, the Texas Department of Transportation removed these plants, and completed an experimental mowing of one section of the ROW. This site has not yet been thoroughly surveyed since then, but about 20 *dasycalyx* plants, and no hybrids, were seen here in 2005 (FWS).

Temple-Inland site (on private land owned by Temple-Inland Corporation near Highway 94 ROW site in east Trinity County). When initially surveyed in 2001, this site supported more than 300 plants within a large, managed wetland (FWS). However, less than 100 were observed in 2002, about 20 in 2003, and none in 2005. This wetland has been drawn down regularly since 2002 and, combined with the periodic drought that has occurred in this part of Texas, is probably now too dry to sustain the rose-mallow. A meeting with the landowner to discuss future management is necessary in order to preserve this population.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Historical habitat has been affected by wetland drainage and loss, conversion of floodplain depressions and oxbows to stock ponds, stream channelization (reducing riparian depressions), road construction, timber harvesting (loss or degradation of adjacent small wetlands), shrub removal (mowing), cattle grazing around small wetlands (soil compaction, trampling of plants), and herbicide use.

Threats to current habitat include wetland alteration (drainage or conversion to stock ponds); herbicide use on private lands by ranchers and along powerline ROWs by Texas Department of Transportation (this is becoming a frequent practice); grazing; and mowing. One population of about 50 was found in 1991 on the south side of Highway 230 southwest of Lovelady along a stock pond. This population was gradually lost to herbicide use and soil compaction by cattle (Warnock 1995). The Highway 230 ROW site was also impacted by herbicide use in 2000, reducing the number of rose-mallows from a high of 14 in 1999 to apparently none in 2005 (Poole 2001). The use of herbicides by Texas Department of Transportation is increasing their use of herbicides to remove vegetation in ROW areas because it is less expensive than mechanical mowing (TXDOT, pers. comm.). A shift in the flooding regime has had a detrimental effect on rose-mallows on the Temple-Inland tract and at one National Forest introduction site (FWS). The Lovelady private land site has been impacted by cattle grazing as well, causing soil compaction and trampling of plants (FWS). The Cherokee site is scheduled for inundation by the Eastex reservoir, eliminating any possibility of restoring *H. dasycalyx* to the area.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Members of the *Hibiscus* genus are of high horticultural interest, but no over-utilization threats are currently known.

C. Disease or predation. Although the first foliage of the year is often consumed by insects before mid-summer, rose-mallow plants regularly produce a second crop of leaves which are not eaten, so predation is not generally seen as a major threat. However, in 2001, about 90% of rose-mallow leaves at the Lovelady site showed evidence of insect herbivory. Although we do not consider insect-related impacts to be a threat factor at this time, the potential effect of insects on reproductive success at this site is unknown and should be investigated.

D. The inadequacy of existing regulatory mechanisms. Davy Crockett National Forest has been supportive and fully cooperative with Clear Lake regarding informal protection for the three introduced and one new populations. However, no Candidate Conservation Agreements have been developed to date to ensure formal protection measures. Such agreements are planned for the future, and their development will reveal the degree of protection to which the Forest Service can commit for these sites.

All other rose-mallow sites are on private land or within State (Texas Department of Transportation) highway right-of-way. Management agreements which restrict herbicides and mowing have been developed for specific ROW sites that support sensitive plants. However, not all road maintenance crews are always aware of this. The Lovelady ROW site has been mistakenly treated with herbicides (FWS). The Highway 94 ROW site has been mistakenly mowed during the flowering season (Poole 2001). Moreover, all three ROW sites remain vulnerable to contaminated wastewater from adjacent roads and herbicide drift from adjacent private lands (FWS).

In general, plants on private lands receive little protection unless the landowner is willing to establish such restrictions. Protection measures for all plants are limited in Texas because of the large proportion (97 percent) of private land and the general lack of state-level laws or regulations involving activities that impact the species and its habitat. Currently, there are no restrictions on the use of herbicides near populations on private land. Although Candidate Conservation Agreements (CCA) have been developed for two sites on private land, the landowners are not legally bound to follow all provisions. A CCA is in place for the Temple-Inland population. However, the quality of habitat and the number of rose-mallows at this site has declined during the past two years, partly due to drought but also due to the role of the wetland. The wetland that has supported rose-mallows is used to maintain water levels in an adjacent larger wetland. The management of this larger wetland takes precedence over the smaller one. Temple-Inland will be approached regarding this conflict, but the degree of effort that Temple-Inland might be willing to commit to change this situation is unknown at this time.

An Agreement was also developed and put into place for the Champion site, a high-quality location that supported a healthy population of the species. However, International Paper acquired Champion in 2001 and has been selling off most of its land. The new landowner of this site, and the current status of the rose-mallow population, are currently unknown but will be determined as soon as possible.

The Cherokee County population on private land along Mud Creek was probably extensive at

one time due to the many depressional wetlands along a wide, shallow area. However, this site is scheduled to be inundated by the 10,000-acre Eastex reservoir by 2007, which will be administered by the U.S. Army Corps of Engineers (COE) (Frye and Curtis, 1990). Although the COE considers establishment of a recovery population within project lands to be desirable, this level of support is not required for a candidate species.

E. Other natural or manmade factors affecting its continued existence. All populations of *H. dasycalyx* are currently at risk of genetic swamping by invasion of two other sympatric *Hibiscus* species, which appear to be better adapted to human disturbance. In 2001, TPWD and FWS recorded signs of active hybridization at the Highway 94 site. Five hybrids, along with ten *H. moscheutos* plants and four *H. laevis* plants, were observed in an area that was frequently mowed (Poole 2001). Hybridization is so prevalent at the Ponta site that any “true” *dasycalyx* has likely been eliminated. Hybridization has not been a problem at other *H. dasycalyx* sites to date because no *H. laevis* or *H. moscheutos* have been seen at those sites (FWS). The National Forest introduction sites were searched for these two species before they were approved for this use. However, if either of these two *Hibiscus* species should appear at a *H. dasycalyx* site, the genetic integrity of this plant could be compromised very quickly.

The rapid ease with which these three species hybridize with each other was the primary reason for the genetic assessment that was conducted by Stephen F. Austin University. The genetic integrity of *H. dasycalyx*, in relation to the two other sympatric *Hibiscus* species, needed to be confirmed before any further recovery actions could be implemented. The work by SFASU has assured us that *H. dasycalyx* is a separate species (Mendoza 2004). However, the similarity of this species with *H. laevis* and *H. moscheutos* indicates that hybridization could occur very rapidly and extensively should these species ever invade *H. dasycalyx* sites (Clack 2003, Mendoza 2004).

Extreme drought (the worst ever recorded in Texas) in east TX during years 1998-2001 resulted in stunted plants and erratic flowering and fruiting. Most sites that supported flowering held some water in the beginning of the season, but soon dried, probably reducing fruiting success. Rainfall returned in 2002, resulting in improved survival and reproduction (FWS). Short-term, but persistent droughts have continued to occur during sensitive parts of the species' life cycle each year since then, undoubtedly reducing the reproductive capacity of the species, and maintaining low numbers, at most sites. Long-term drought would assuredly have a highly detrimental effect on a species so dependent on adequate wetland conditions during the spring and early summer.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

1. An *ad hoc* recovery team is in place that includes FWS, Texas Parks and Wildlife Department (TPWD), U.S. Forest Service (USFS), The Nature Conservancy of Texas (TNC), Stephen F. Austin State University, and private industry. This informal team,

usually consisting of just one representative, normally the species expert, from each of these agencies, has met annually since 1999 with the purpose of discussing the status of the rose-mallow and implementation of possible recovery measures. FWS's Clear Lake office has initiated these meetings and has generally used them to acquire guidance and consensus for proposed recovery activities, such as the National Forest introductions

2. With partial funding from National Fish and Wildlife Foundation, Stephen F. Austin State University (SFASU) has completed a genetic analysis of the Neches River rose-mallow and its related species, based on plant tissue collected from known sites in summer 1998 (Mendoza 2004). SFASU is continuing a study of the species' habitat needs based on experimental plantings at a site on Mill Creek in Nacogdoches County. Finally, they have propagated more than 3000 plants for reintroduction efforts.
3. TPWD has management agreements in place with Texas Department of Transportation to protect three right-of-way populations (Lovelady, Ponta, Highway 94). However, population numbers at all three sites has continued to decline, due to herbicide use or accidental mowing by maintenance personnel.
4. Davy Crockett National Forest (DCNF) represents the only public land within the range of the rose-mallow. Using aerial photos and site visits, FWS-Clear Lake identified three wetland sites that supported favorable wetland habitat. DCNF Ranger Raoul Gagne and Forest Supervisor Ronnie Raum have supported reintroduction of plants into all three sites. In 2000 and in 2004, a total of nearly 1000 plants from SFASU's facilities were placed within DCNF, with the help of SFASU, FWS, TPWD, USFS, and TNC. Populations at at least two of these sites are displaying relatively high survival and reproduction.
5. FWS-Clear Lake developed a Candidate Conservation Agreement with Temple-Inland Forest Products Corporation (east Trinity County) for the population found on its land. The agreement allows for future protection for the current population and the possibility of reintroductions of the species in additional sections of their property. With final signature dated August 27, 2002, the agreement remains effective until August 27, 2006,. However, the population at this site has declined substantially, and the agreement may need to be revisited.
6. In January of 1998, FWS-Clear Lake entered into a Candidate Conservation Agreement with Champion International to protect the population found on their land in west Trinity County. However, in mid-2001 Champion was bought and absorbed by the International Paper Corporation (IP) (world's largest paper and forest products company). It is doubtful that IP knew of or cared about the CCA since, after the hostile take-over, most of Champion's lands were immediately listed for sale, including the rose-mallow site. It is likely that the land has been bought and sold more than once. IP has been reluctant to provide any specific information and is unwilling to provide access to its lands. FWS plans to determine the current ownership through the Trinity County tax appraisal office, and approach the landowner regarding the rose-mallow.

7. In 2004, the Natural Areas Preservation Association (NAPA) purchased the Lovelady private land site, located southwest of Lovelady in Houston County. We expect that NAPA's ownership of this site will help secure at least one stable population of the rose-mallow.
8. A large population was discovered in 2003 on Forest Service land, Compartment 55. This site has not yet been fully surveyed. However, there is no current land-use of the area except hunting. Therefore, this population is expected to remain stable in future years.
9. Seeds of the species have been collected and distributed to two arboretums and to the USDA seed bank in Fort Collins, Colorado, for permanent storage.

SUMMARY OF THREATS: This species is threatened by destruction, modification, or curtailment of its habitat and range as a result of herbiciding (on ROWs and private land), shrub removal (mowing), cattle grazing (compaction and trampling), wetland loss (drainage and filling), wetland degradation (conversion to stock ponds or recreational ponds), and invasion by other mallow species. In addition, existing regulatory mechanisms have not been adequate to ensure the maintenance of populations at the limited number of sites occupied by the species. Management agreements for ROW sites have not been sufficient to protect the species at three sites. A Candidate Conservation Agreement has not been effective for maintaining the population at one site. The status of another site previously protected by a CCA is unknown at this time. The level of protection that the National Forest will be willing to commit to for introduced species is currently unknown. The species is highly vulnerable to hybridization with two sympatric Hibiscus species. Long-term drought, or changes in the water regime at existing sites, would be very detrimental to the species.

RECOMMENDED CONSERVATION MEASURES: Future recommended measures should include wetland preservation, restrictions on herbicide use, reductions in cattle use, and restrictions on mowing and shrub removal along wetlands.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6

Moderate To Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number

Magnitude: The magnitude of threat is considered high at this time. Only four sites are known to be maintaining healthy populations, supporting a total of 1,050 individuals. One of these has been protected through purchase by land trust, although grazing remains a factor. One lies on USFS land. Two reintroduced populations on USFS land are doing well, but long-term persistence has yet to be established. However, the status of one previously healthy population on private land covered by a Candidate Conservation Agreement is now unknown due to a change in ownership. FWS will investigate. The Temple-Inland population has drastically declined due to an altered water regime. It is unknown whether this population can be restored if water management is rectified. One introduced population on USFS land was affected detrimentally when the wetland hydrology was altered, and it is currently unknown whether the remaining plants will be able to disperse to newly created wetland areas. All right-of-way populations are either small (Highway 94) or have been obliterated

Imminence: Threats are considered non-imminent at this time. The Lovelady site is currently being impacted by cattle grazing, but ways to reduce or eliminate this threat will be investigated. Four populations on USFS lands should remain stable in the short-term since no change in habitat management is expected. The Temple-Inland site has declined severely due to a change in hydrology, but a meeting with the landowner will be explored. Current land-use on the Champion site is unknown, and its population may already be gone, but FWS will investigate and determine current ownership. Two ROW populations have been obliterated, but numbers of individuals have always been low at these sites. The Highway 94 ROW site maintains only very small numbers (20), and will probably remain vulnerable to mowing and herbiciding.

 X Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No, not at this time. One site is covered by a Candidate Conservation Agreement. A land trust organization has purchased another site to protect the species. A large population was discovered last year on National Forest land. At least two introduction areas are doing well, and the Forest Service supports additional plantings. Greenhouse plants at Stephen F. Austin State University are available for additional introductions. Habitat studies at SFASU are continuing. Therefore, we conclude that no

emergency listing is warranted at this time.

DESCRIPTION OF MONITORING: Conservation of this species has involved the Clear Lake Field Office, the Lufkin Suboffice, the Texas Parks and Wildlife Department (TPWD), the U.S. Forest Service (USFS), The Nature Conservancy of Texas (TNC), Natural Areas Preservation Association (NAPA), Stephen F. Austin State University (SFASU), the Sierra Club, and private industry. The USFS assists FWS in monitoring the status of USFS population. TPWD also assists when possible in annual visits to all known sites. However, our office assumes primary responsibility for monitoring all sites with visits at least once each year. Temple-Inland also allows FWS full access to monitor their population. The Champion site has not been monitored for at least three years, but our office will try to determine new ownership and secure permission to view the site on a regular basis.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: In August 2005, the Arlington Ecological Services Field Office issued a letter to TPWD asking for their comments on candidate species in Texas. TPWD responded by letter on September 30, 2005. The State had no significant comments to provide regarding this species. Due to budget constraints, they were not able to monitor most ROW populations this year. For the same reason, FWS was unable to conduct extensive surveys in 2005.

Indicate which State(s) did not provide any information or comments: NA

LITERATURE CITED

- Blake, S.F. 1958. Two species of *Hibiscus* from Texas. *Journal of the Washington Academy of Science* 48:277-280
- Blanchard, O.J. 1976. A revision of species segregated from *Hibiscus* sect. *Trionum* (Medicus) de Candolle sensu lato (Malvaceae). Ph.D. dissertation. Cornell University, NY.
- Carr, W.R., S.L. Orzell, and J.M. Poole. 1990-1999. Texas Natural Heritage Program element occurrence records. Texas Parks and Wildlife Department, Endangered Resources Branch, Austin, TX.
- Clack, B. 2003. Genetic diversity between *Hibiscus dasycalyx*, *Hibiscus laevis*, and *Hibiscus moscheutos* utilizing RAPD and ISSR techniques. Stephen F. Austin State University, Nacogdoches, TX. 8pp.
- Frye, R., and Curtis, D. 1990. Texas water and wildlife – an assessment of direct impacts to wildlife habitat from future water development projects. Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service. 59pp.

- Griffith, C. 2003. Census of Neches River rose-mallow (*Hibiscus dasycalyx*) population on 10 July 2003. Davy Crockett National Forest, U.S. Forest Service, Ratcliff, TX. 4pp.
- Kennedy, K.L., S. Orzell, and J. Poole. 1990. Status report on *Hibiscus dasycalyx* (Neches River rose-mallow). Texas Natural Heritage Program, Texas Park and Wildlife Department, Austin, TX.
- Klips, R.A. 1995. Genetic affinity of the rare eastern Texas endemic *Hibiscus dasycalyx* (Malvaceae). American Journal of Botany 82(11):1463-1472.
- Mendoza, E.A. 2004. Genetic diversity within *Hibiscus dasycalyx*, *Hibiscus laevis*, and *Hibiscus moscheutos* utilizing ISSR techniques. Masters thesis. Stephen F. Austin State University, Nacogdoches, TX. 111pp.
- Poole, J. 2001. *Hibiscus dasycalyx* monitoring on highway right-of-way. Texas Parks and Wildlife Department, Austin, TX. 1p.
- Poole, J. and Singhurst, J. 2003. *Hibiscus dasycalyx* monitoring on highway right-of-way. Texas Parks and Wildlife Department, Austin, TX. 2pp.
- Scott, S. 1997. The horticultural treatment and introduction of a rare wetland plant - Neches River rose-mallow (*Hibiscus dasycalyx*). M.S. thesis, Stephen F. Austin State University. 57pp.
- Scott, S. and D. Creech. 1997. Saving the rare Neches River rose-mallow *Hibiscus dasycalyx*. Native Plant Society of Texas News 15(1):10.
- Warnock, M.J. 1995. Status report on *Hibiscus dasycalyx*. Prepared for the U.S. Fish and Wildlife Service. 40pp.
- Wise, D.A., and M.Y. Menzel. 1971. Genetic affinities of the North American species of *Hibiscus* sect. *Trionum*. Britonia 23:425-437.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Rich McDonald 11/17/2005
Acting Regional Director, Fish and Wildlife Service Date



Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005
Conducted by: Carlos Mendoza